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## NORTH AYRSHIRE COUNCIL

26 November 2019

### Cabinet

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**Title:** **Proposed Flood Protection Schemes for Submission to SEPA as part of the Flood Risk Management Cycle of National Prioritisation**

**Purpose:** To advise Cabinet of proposals for three flood protection scheme proposals for submission to SEPA for the next stage of evaluation for potential funding.

**Recommendation:** That Cabinet approves three potential flood protection schemes for submission to SEPA for evaluation:

- a) Lower Irvine Valley Flood Scheme proposal
  - b) Keppen Burn Culvert Upgrade proposal
  - c) Brodick & Lamlash Flood Scheme proposal
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### 1. Executive Summary

- 1.1 The Flood Risk Management (Scotland) Act 2009 lays the foundation for a risk based, plan-led, sustainable approach to flood risk management in Scotland.
- 1.2 The Act sets out a national framework for flood risk management which follows a cycle of strategy then a cycle of planning. The planning cycle seeks to deliver studies, projects and other measures identified through the strategy cycle. These two processes are designed to overlap to deliver an ongoing programme of flood risk activity.
- 1.3 Potential flood schemes for inclusion in the '2<sup>nd</sup> Cycle of National Prioritisation' are being invited by the Scottish Environment Protection Agency (SEPA). SEPA will collate projects bids from each flooding Local Plan District in Scotland. The timetable to carry out the prioritisation is indicated below:
  - 23 December 2019: Deadline for submission of proposed flooding schemes to SEPA
  - June 2020: first draft of National Prioritisation published
  - December 2020: 2<sup>nd</sup> Cycle Flood Risk Management Strategy public consultation
  - December 2021: Final 2<sup>nd</sup> Cycle Flood Risk Management Strategy published
  - Summer 2022: 2<sup>nd</sup> Cycle Flood Risk Management Plan published
- 1.4 Following detailed flood risk studies, three potential projects have been identified for submission to SEPA for consideration from a North Ayrshire perspective. These are: (i) Lower Irvine Valley Flood Scheme (ii) Keppen Burn Culvert Upgrade proposal; and (iii)

Brodict & Lamlash Flood Scheme. Details of each project are provided within the body of the report and the appendices. The projects have been identified through evaluation of both national and local flood risk information and analysis.

- 1.5 The principle of flooding scheme funding is that, subject to evaluation and prioritisation by SEPA, approved projects are grant funded by the Scottish Government for 80% of the total project costs. The remaining 20% is funded by the local authority (including contributions from other stakeholders where relevant).
- 1.6 It is important to note that submission of bids at this stage does not mean that the project will be grant funded. SEPA and the Scottish Government have a limited budget for national flooding schemes, and consider projects based on a range of criteria, including analysis of the benefit/cost ratio of each submission from Local Plan Districts across the country. Projects are then prioritised accordingly for funding. The projects identified would be scheduled for delivery between late 2022 and 2028.
- 1.7 Cabinet is invited to review the proposed flooding schemes and approve their submission to SEPA for the next stage of evaluation and prioritisation.

## **2. Background**

- 2.1 The Flood Risk Management (Scotland) Act 2009 sets out a national approach to flood risk management which follows a cycle of strategy then a cycle of planning. The latter cycle seeks to deliver studies, projects and other measures identified through the strategy cycle. These two processes are designed to overlap to deliver an ongoing programme of flood risk activity. The 1<sup>st</sup> Cycle of Flood Risk Management Strategy took place between 2010 and 2016. SEPA divided Scotland into 12 Local Plan Districts (LPDs). The 'Ayrshire' district comprises the North, East and South Ayrshire Council areas. North Ayrshire is the lead authority for the Ayrshire LPD.
- 2.2 The 1<sup>st</sup> Cycle of National and Local Flood Risk Management Strategy for Ayrshire was developed by SEPA in close collaboration with local authorities, Scottish Water, Forestry Commission, Scottish Natural Heritage and Transport Scotland. It was published in December 2015.
- 2.3 The 1<sup>st</sup> Cycle of Flood Risk Management Plan was subsequently published in June 2016. It proposed implementation of two major Flood Protection Schemes (Upper Garnock and Millport Coastal), but also completion of a number of flooding studies to determine potential future projects which could be considered for inclusion in the next Flood Risk Management Plan cycle.
- 2.4 The outcome of the flooding studies undertaken as part of the 1<sup>st</sup> Flood Risk Management Plan is that three schemes in North Ayrshire are being proposed for submission to the National Prioritisation exercise. Subject to evaluation and prioritisation with submissions from other Local Plan Districts, this may lead to them being included as projects for further development in the 2<sup>nd</sup> Cycle of the Ayrshire Local Flood Risk Management Plan which will run from 2022 until 2028. The three schemes are detailed in the following table below:

Delivery Lead	Proposed scheme	Indicative Cost (£)	Current Scheme Stage
NAC	Lower Irvine Valley Flood Scheme	14.85m	Feasibility Study/Outline option Appraisal
NAC/Transport Scotland/ Network Rail	Keppernburn Culvert Upgrade	2.32m	Detailed Design
NAC	Brodick and Lamlash	1.2m	Feasibility Study/Outline option Appraisal

2.5 Each of the three projects is further detailed in the following paragraphs. There is a process led by SEPA and the Scottish Government to assess project bids for future cycles, the details of which are provided below at paragraph 2.14.

### Lower Irvine Valley Flood Scheme Proposal

2.6 It was agreed with SEPA that SEPA's Fluvial Flood Hazard map for the Lower Irvine Catchment had low confidence and that a Flood Risk Assessment (FRA) was required to improve understanding of the flood risk to this area. The FRA was completed in 2017.

2.7 The option appraisal for flood mitigation was carried out during 2018. An option to protect Irvine up to the 1 in 200 years return period flood event could not produce a positive benefit/cost ratio therefore the options had to be extended to look at a lower return period protection. The findings of the extended option appraisal indicated that it is potentially viable to offer protection to 180 residential properties and 60 commercial properties against a 1 in 100 year flood event.

2.8 The recommended option comprises the following combination of measures, the physical elements of which are illustrated in the plan at Appendix 1:

- Direct defences, consisting of 3.7km of flood walls and 2.7km of flood embankment
- Property Level Protection (PLP) for Irvine Sports Club with an escape route
- PLP for 35 properties
- Emergency Plan, including a Traffic Management Plan

2.9 The summary of the outline cost of the proposed scheme (including optimism bias, which adds an additional element to the budget to cover cost risks) indicates that there is a positive benefit/cost ratio when taking into account the property damage costs from a 1 in 100 year flooding event:

Recommended Option	Overall Cost (incl 60% optimism Bias)	Total Benefit for 1 in 100 year	BCR for 1 in 100 year
Structural Option 1	£14,853,847	£20,886,890	1.41

## Keppen Burn, Fairlie Culvert Upgrade Proposal

2.10 The case for a Keppen Burn Culvert Upgrade was identified in the first cycle of the Ayrshire Local Flood Risk Management Plan. The culvert is made up from a combination of piped and open sections flowing from the hill side of Kelburn Estate towards to Firth of Clyde. Flooding has previously disrupted the railway line at this location and regularly disrupts the A78 trunk road. Local businesses, such as the Fairlie Marina, are also impacted as the flow path from the culvert follows the local topography. A scheme to alleviate flooding was developed jointly between the Council, Network Rail and Transport Scotland. The FRA, completed in 2014, identified that the culvert capacity is low and some degree of flooding can be expected to occur on average once every two years. The potential number of properties at risk of flooding was quantified and is summarised below:

Keppen Burn - Properties at risk	Return Period (years)						
	2	5	10	25	50	100	200
Total	18	20	23	31	36	36	41

2.11 The detailed design was completed in 2016 and was followed by an economic assessment in 2017. In 2019, a further hydrology and economic review was undertaken to ensure that the latest hydrology dataset was used and that all SEPA requirements are being met.

2.12 The findings of the economic appraisal are summarised below. The scheme proposal has a positive benefit/cost ratio and the delivery costs of the scheme would be shared by Network Rail, Transport Scotland and North Ayrshire Council. Further negotiation would require to take place on apportionment of the 20% funding costs to be shared between the parties if the project was to be taken forward. The scheme elements are detailed in Appendix 2.

Recommended Option	Overall Cost (incl 40% optimism Bias)	Total Benefit for 1 in 200 year	BCR for 1 in 200 year
Culvert Structure Upgrade	£2,317,150	£2,433,107	1.05

## Brodict and Lamlash Scheme Proposal

2.13 It was agreed with SEPA that SEPA's Flood Hazard map for the Glen Coyle Water (Brodict) and Monamore and Benlister Burns (Lamlash) had low confidence. Therefore, a FRA was required to improve understanding of the flood risk to this area. There was also a need to factor in flooding from coastal sources. The FRA was completed in 2017 for both catchments and the number of properties at risk of a 1 in 200 years flood event are summarised below:

In a 1 in 200 year event	Residential Properties	Commercial Properties
Brodict All Flood cells	86	34
Lamlash All Flood cells	127	25

2.14 During the FRA development and later in the option appraisal stage the work was reviewed and supported by SEPA. The FRA was completed to a high specification to

satisfy SEPA's requirement for adopting the result and incorporating it into the SEPA Hazard Map database.

2.15 The option appraisal for flood mitigation was undertaken during 2018. Protecting the entire town of either Lamlash or Brodick with a comprehensive flood scheme to protect against the 1 in 200 years return period flood is not economically viable. Therefore, the options had to be extended to look at each flood cell (i.e. the areas predicted to flood) and confirm the potential to protect clusters of properties flooding from the same flood mechanism. The findings of flood risk to properties and extended option appraisals show that it is possible to protect some of the flood cells in both towns. The findings are summarised below. A diagram outlining the proposals is provided at Appendix 3a and 3b. A total of 68 residential properties and 10 commercial properties would be protected under the scheme proposals.

Brodick:

Recommended Options	Overall Cost (incl 60% optimism Bias)	Total Benefit for 1 in x year	BCR for 1 in x year
Flood cell 1 _ 1 in 100 years	£28,836	£27,354	0.95
Flood cell 2 _ 1 in 200 years	£27,624	£75,561	2.74
Flood cell 3 _ 1 in 200 years	£500,363	£1,178,079	2.35
<b>Total</b>	<b>£556,823</b>	<b>£1,280,994</b>	

Lamlash:

Recommended Options	Overall Cost (incl 60% optimism Bias)	Total Benefit for 1 in 200 year	BCR for 1 in 200 year
Flood cell 5	£627,278	£574,664	0.93

2.16 The two island communities are subject to flooding from similar coastal and fluvial flood sources. However, they only belong in a broader sense to the same catchment. Brodick and Lamlash could be promoted as two separate flood schemes, with the acknowledgement that the Lamlash scheme proposal has a lower benefit/cost ratio. If promoted as a single scheme for Brodick/Lamlash catchment it would have a combined benefit/cost ratio of 1.57. Officers will discuss the best approach to take with SEPA and the Scottish Government as part of their appraisal.

## 2<sup>nd</sup> National Prioritisation Process and Timescale

2.17 The prioritisation process for the 2<sup>nd</sup> Cycle, which will cover the period 2022 until 2028, will be carried out using a multi-criteria approach based on a range of financial and non-financial criteria. The latest indication of the timescales for the next steps in the Flood Risk Management process are as follows:

- 23 December 2019: Deadline for submission of proposed flooding schemes to SEPA
- June 2020: first draft of National Prioritisation published
- December 2020: 2<sup>nd</sup> Cycle Flood Risk Management Strategy public consultation

- December 2021: Final 2<sup>nd</sup> Cycle Flood Risk Management Strategy published
- Summer 2022: 2<sup>nd</sup> Cycle Flood Risk Management Plan published

### 3. Proposals

- 3.1 It is proposed that Cabinet notes the level of flood risk to the study areas presented in this report and the mitigation proposals developed.
- 3.2 It is proposed that Cabinet approves the submission of the proposed flood schemes to SEPA for the 2<sup>nd</sup> Cycle of National Prioritisation, which will inform publication of the subsequent 2<sup>nd</sup> Cycle Flood Risk Management Strategy and Flood Risk Management Plan. The Plan will cover the period 2022 until 2028.
- 3.3 It must be noted that if any of the schemes are accepted by SEPA and the Scottish Government, then the Council would be required to financially commit to the delivery of the schemes, including capital budget provision for the 20% local authority share of each project (see paragraph 4.1 below) within the delivery period agreed with Scottish Government. Flooding schemes, by their nature, have significant lead-in times for delivery due to the requirement for detailed design, public consultation, land assembly and procurement. If any of the three schemes within this report are accepted through the National Prioritisation for funding, construction would likely begin sometime after 2025.

### 4. Implications/Socio-economic Duty

#### Financial

- 4.1 The high-level indicative costs associated with the delivery of the proposed schemes are estimated as follows:

Delivery Lead	Proposed Scheme	Total indicative costs (£ Million)	NAC share (20%) (£ Million)	Scottish Government share (80%) (£ Million)
NAC	Lower Irvine Valley Flood Scheme	14.850	2.970	11.88
NAC/Transport Scotland/ Network Rail	Keppen Burn Culvert Upgrade	2.320	0.464*	1.856
NAC	Brodick and Lamlash	1.200	0.240	0.960
<b>Total</b>		<b>18.370</b>	<b>3.674</b>	<b>14.696</b>

\* Note: this would be shared (see below).

- 4.1.2 If any of the schemes are successfully prioritised, then they will attract 80% funding from Scottish Government with the remaining 20% funding being the responsibility of the local authority. The exception is the Keppen Burn where the project is expected to be delivered jointly with Transport Scotland and Network Rail. The Council's share of all funding required would be reviewed as part of a future Capital Plan refresh, depending on the outcome of the prioritisation exercise.

#### Human Resources

4.2 None.

### **Legal**

4.3 The Scheme delivery will follow the process outlined in the 2009 Flood Risk Management (Scotland) Act.

### **Equality/Socio-economic**

4.4 An Equality Impact Assessment will be carried out during the detailed design stage of any scheme as it progresses.

### **Environmental and Sustainability**

4.5 If any or all of the schemes are prioritised and developed further an environmental screening exercise will clarify the extent of any environmental surveys required.

### **Key Priorities**

4.6 The flood protection schemes will enhance the safety of people and communities; create vibrant, welcoming and attractive places; and ensure a sustainable environment in the affected areas which aligns to the priorities of the Council Plan 2019 – 2024.

### **Community Wealth Building**

4.7 Opportunities for Community Wealth Building would be reviewed as part of the development of any flood scheme projects.

## **5. Consultation**

5.1 Any requirements for consultation will be linked to the result of the 2<sup>nd</sup> National Prioritisation outcome.

RUSSELL McCUTCHEON  
Executive Director (Place)

For further information please contact **David Hammond, Interim Head of Commercial Services**, on **01294 324570**.

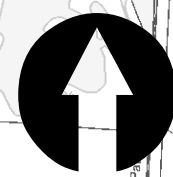
### **Background Papers**

Appendix 1– Lower Irvine Valley Flood Extent Map and Proposed Scheme Layout

Appendix 2 – Keppen Burn, Fairlie Culvert Upgrade Scheme Layout

Appendix 3 – Brodick and Lamlash Flood Extent Maps





# Appendix A - Lower Irvine Valley Flood Extent Map and Proposed Scheme Layout

**Legend**

**Direct Defence**

Embankment

Wall

Property Level Protection

Sports Club PLP

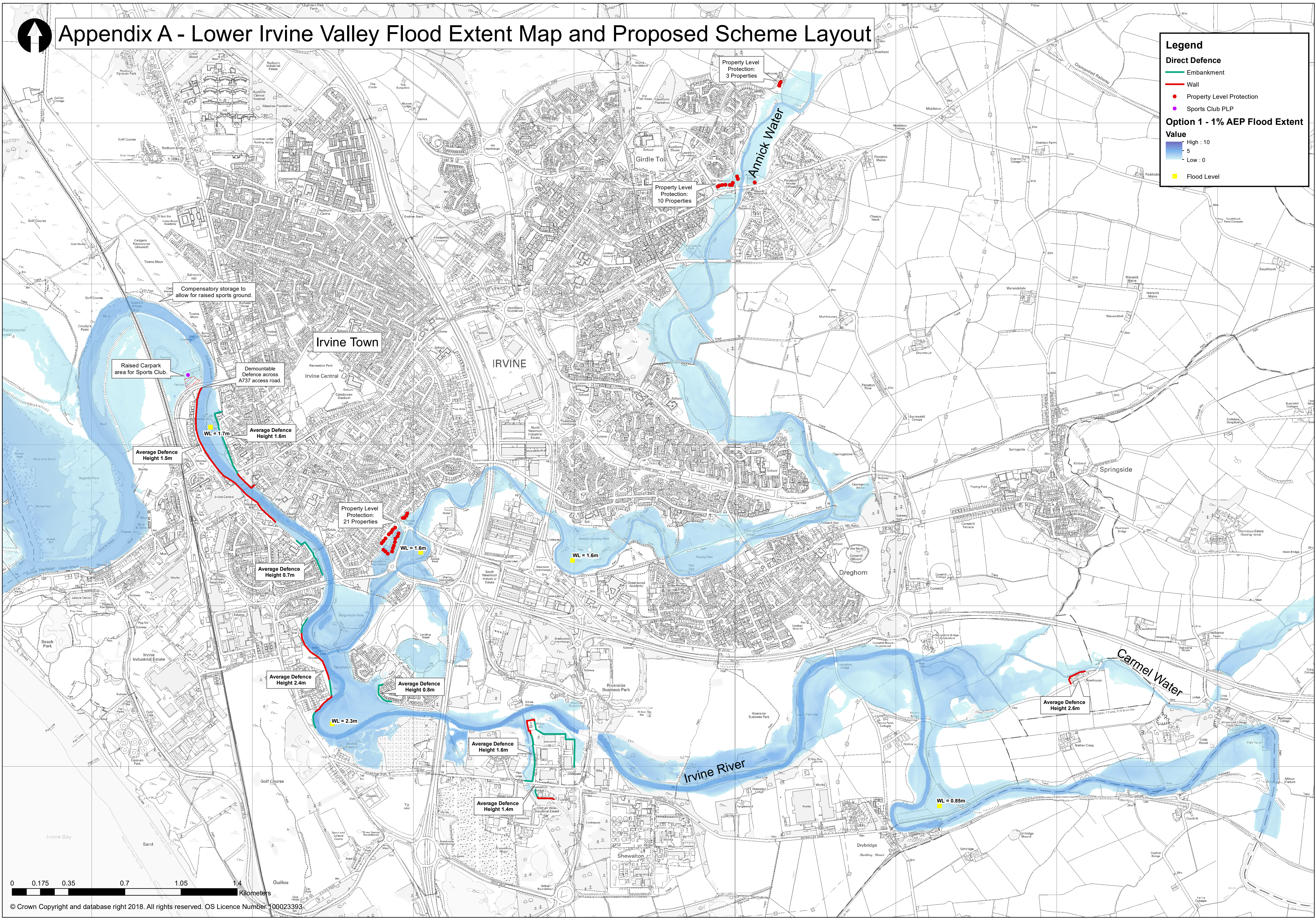
**Option 1 - 1% AEP Flood Extent**

**Value**

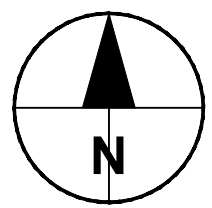
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5

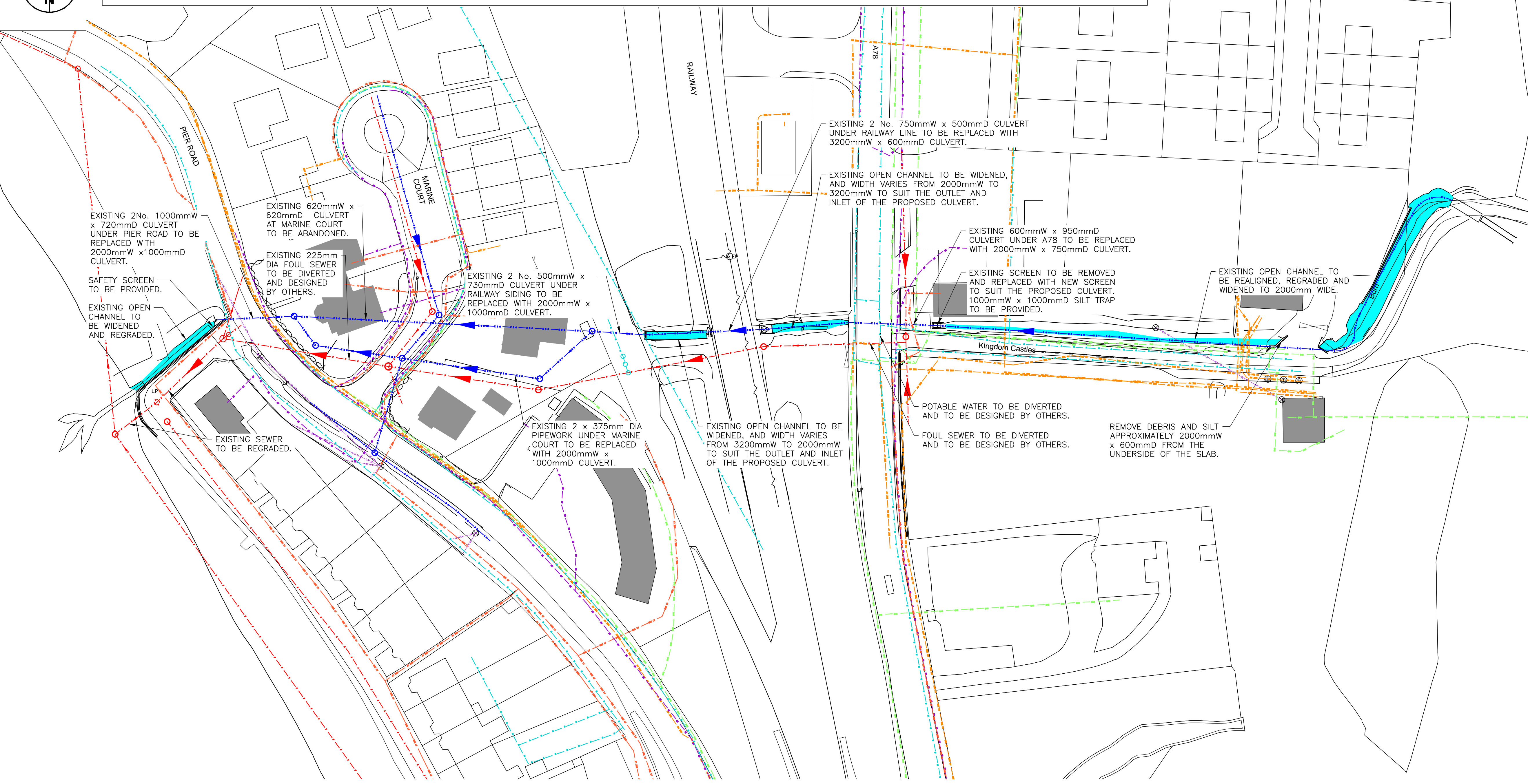
Low : 0

Flood Level





# Appendix B– Keppen Burn, Fairlie Culvert Upgrade Scheme Layout









## Appendix C2 – Lamlash Flood Extent Map and Identified Flood Cells

